

of clear days for the district was 14; partly cloudy, 7; and cloudy, 10.

Southwesterly winds prevailed in southern and north-westerly winds in northern sections. The highest velocity reported was at the rate of 46 miles an hour from the north, on the 1st, at St. Paul, Minn.

#### DR. FRIEDRICH BRENDEL.

[By M. L. FULLER, Local Forecaster, Peoria, Ill.]

Friedrich Brendel, M. D., was a native of Erlangen, Bavaria, from whose university he graduated in 1839. He was a patriot in the German Revolution of 1848, and was compelled for that reason to leave the Fatherland in 1850. After two years' residence in St. Louis, Mo., he settled in Peoria, Ill., in 1852. His records of temperature and rainfall began in December, 1855, and continued practically unbroken for 50 years, constituting, with the subsequent work of the Weather Bureau station, the longest continuous record kept within the State of Illinois.

Dr. Brendel was a physician of excellent standing, a botanist of note, author of a 90-page pamphlet on "Flora Peoriana," a man of scientific tastes, and of deep devotion to his work. It is related of him on the best of authority that in his later years, while seriously ill and lying day after day apparently unconscious, he would still rouse regularly about the observation hour and direct the nurses to read the thermometers. The records kept by such an observer possess more than ordinary interest. Dr. Brendel's death occurred August 10, 1912, at the advanced age of nearly 93 years. His records have been extensively used in compiling the climatology of Illinois, and the originals are in the Weather Bureau offices at Springfield and Peoria.

#### PROLONGED DRY PERIOD IN MINNESOTA.

[THOMAS A. BLAIR, observer, Minneapolis, Minn.]

The fall of 1912 has been notable in Minnesota for mild temperatures and deficiency of precipitation. Following a pleasant summer, marked by no long heated periods, and in which the average daily temperature for the months of June to September, inclusive, was 1.5° below the normal, the months of October and November prolonged the agreeable weather and shortened the winter by temperature departures in the opposite direction, the average daily excess in October being 1.7° and in November 5.6°, with an entire absence of cold waves. For October the average temperature for the State was 47.5°, which has been exceeded five times during the past 18 years; for November the mean was 33.9°, which has been exceeded but twice during the same period; likewise, the combined mean of the two months has been exceeded but twice.

But it is to the long dry spell and the general deficiency in precipitation that special attention is directed in this note. The deficiency began in September, amounting in that month to 0.49 inch, and was general except in the Red River Valley. October precipitation was below normal at every station in the State except Hallock, in the extreme northwest. The average amount was 0.97 inch, which equals the amount in the extremely dry year of 1910. The only less amount recorded was 0.25 inch, in 1895. In November the southeastern counties of the State received one good rain, on the 12th; the rest of the State and, for the remainder of the month, the entire State, received but very light precipitation,

amounting in general to less than 0.20 inch. Over a considerable portion of the State, principally in the upper Minnesota Valley, no amounts in excess of a trace fell during the month. At Minneapolis there was 0.08 inch, the least amount for November recorded in 77 years of observations in this vicinity. The State average for November was 0.36 inch, which is one-third the normal amount. Less amounts are recorded in 1903 and 1904. The total for the three months of September, October, and November was 4.36 inches. Only the years 1897 and 1910, with 3.97 and 3.94, respectively, had smaller averages. The year 1910 was the driest year on record, precipitation being deficient in all months except January; but in 1897, as in 1912, there was an accumulated excess at the beginning of September.

The area in which the drought was most marked extends from east to west across the central portion of the State, between the latitudes of St. Paul and Duluth. The following is a list of stations at which no measurable amount of precipitation fell for the periods indicated:

Alexandria.....	57 days	Sept. 26-Nov. 21
Beardsley.....	44 days	Oct. 12-Nov. 24
Bird Island.....	49 days	Oct. 13-Nov. 30
Collegeville.....	41 days	Oct. 13-Nov. 22
Fort Ripley.....	41 days	Oct. 13-Nov. 22
Glencoe.....	54 days	Oct. 12-Dec. 4
Halstad.....	45 days	Oct. 30-Dec. 13
Hinckley.....	44 days	Oct. 12-Nov. 24
Long Prairie.....	44 days	Oct. 12-Nov. 24
Lynd.....	50 days	Oct. 12-Nov. 30
Milan.....	44 days	Oct. 12-Nov. 24
Montevideo.....	41 days	Oct. 12-Nov. 21
Morris.....	44 days	Oct. 12-Nov. 24
New London.....	50 days	Oct. 12-Nov. 30
Osakis.....	42 days	Oct. 12-Nov. 22
Pierz.....	44 days	Oct. 12-Nov. 24
Pipestone.....	54 days	Oct. 12-Dec. 4
St. Cloud.....	43 days	Oct. 13-Nov. 24
Stillwater.....	49 days	Oct. 13-Nov. 30
Taylor Falls.....	35 days	Oct. 21-Nov. 24
Worthington.....	31 days	Oct. 12-Nov. 11

Many of the same stations had much longer periods with amounts of less than 0.20 inch, as shown by the following table:

Alexandria.....	69 days	Sept. 26-Dec. 4	0.17
Beardsley.....	54 days	Oct. 12-Dec. 4	0.05
Bird Island.....	63 days	Oct. 13-Dec. 4	0.17
Campbell.....	45 days	Oct. 11-Nov. 24	0.02
Collegeville.....	53 days	Oct. 13-Dec. 4	0.13
Crookston.....	44 days	Oct. 20-Dec. 2	0.13
Halstad.....	78 days	Sept. 26-Dec. 13	0.11
Itasca State Park.....	36 days	Oct. 30-Dec. 4	0.04
Long Prairie.....	56 days	Oct. 12-Dec. 6	0.10
Lynd.....	66 days	Oct. 12-Dec. 16	0.10
Milan.....	54 days	Oct. 12-Dec. 4	0.10
Minneapolis.....	50 days	Oct. 12-Nov. 30	0.14
Montevideo.....	59 days	Oct. 12-Dec. 9	0.16
Moorhead.....	71 days	Oct. 6-Dec. 15	0.15
Mora.....	44 days	Oct. 12-Nov. 24	0.02
New London.....	54 days	Oct. 12-Dec. 4	0.06
New Ulm.....	50 days	Oct. 12-Nov. 30	0.11
Osakis.....	66 days	Oct. 12-Dec. 16	0.18
Pierz.....	81 days	Oct. 12-Dec. 31	0.19
Pine River Dam.....	50 days	Oct. 12-Nov. 30	0.19
Pipestone.....	66 days	Oct. 12-Dec. 16	0.20
Roseau.....	50 days	Oct. 31-Dec. 19	0.05
St. Cloud.....	49 days	Oct. 13-Nov. 30	0.01
St. Paul.....	40 days	Oct. 22-Nov. 30	0.10
Sandy Lake Dam.....	44 days	Oct. 12-Nov. 24	0.16
Taylor Falls.....	50 days	Oct. 12-Nov. 30	0.13
Two Harbors.....	50 days	Oct. 12-Nov. 30	0.14
Worthington.....	54 days	Oct. 12-Dec. 4	0.15

The period of 44 days from October 12 to November 24, inclusive, was the most common one without measurable precipitation, but the average for the 21 stations of

the first table is 45 days. The extreme period was 57 days, from September 26 to November 21, at Alexandria. The extreme period with less than 0.20 inch was 81 days, at Pierz, from October 12 to December 31, and the average of the 28 stations was 55 days.

Such a prolonged dry spell has probably occurred only in the year 1910. During February and March of that year many stations in the southern part of the State received less than 0.20 inch, and several stations were without measurable rainfall for a period of 50 days. Severe droughts occurred in 1894 and 1900, but without long periods unbroken by showers. In the drought of August and September, 1908, the average duration for the 21 stations where the drought was most marked was 25 days and the longest period at any station with only a trace of precipitation was 31 days.

In contrast with the droughts of other years just mentioned, which caused immense damage to crops, the long

dry spell of 1912 was rather a blessing than an injury. It began after the crops were matured, and gave unusually favorable conditions for harvesting, thrashing, and storing them and for fall plowing. The December business summary published by the Northwestern National Bank of Minneapolis says:

Before the harvest was completed prolonged rains during a period of six weeks caused delay and some damage to the quality of cereals in the shock. These rains were followed by a long dry period with unusually mild temperatures. The farmers have generally taken advantage of this condition to get much of the plowing done that usually must wait until spring. It seems not unreasonable to predict that the improved condition of the soil for next year, on account of the timely plowing, will result in a yield for 1913 sufficiently increased on this account to make up all losses of this year caused by the rains.

The mild temperatures and absence of storms were also of great aid to the transportation companies, enabling them to handle the large crops with less than the usual congestion and car shortage.